



Dow U.S.A.

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April-June 1992 Vinyl Chloride Sampling Summary and Recommendations

Industrial Hygiene sampling for potential exposure to vinyl chloride was performed during April, May and June of 1992. The first set of analytical results (Table 1) produced data which showed a range of concentrations from none detected (0.20 ppm) to 1.6 ppm for 8-hour time-weighted averages (TWA). One 8-hour TWA reading was above the OSHA permissible exposure limit (PEL) of 1 ppm, therefore we recommended that employees performing railcar loading and sampling wear air supplied respiratory protection.

Historical data for 8-hour TWA samples did not support this concentration for the jobs being performed. Additional monitoring was conducted to determine if this concentration was typical for the current loading and sampling procedures. Repeat monitoring gave much lower readings for the full eight hour shift. However, short-term excursion (STEL) samples gave readings from none detected (0.17 ppm) to 4.7 ppm. The OSHA STEL for vinyl chloride is 5 ppm. As a result of the second set of data (Table 2), it was recommended that employees continue wearing air supplied respirators. Monitoring was repeated to determine if there were differences in concentrations based on procedural variations.

The third set of data (Table 3) for connecting and loading VCM railcars revealed that all the 8-hour TWA readings were below the action level of 0.5 ppm and that all short-term task readings were below the STEL of 5 ppm. This data would not indicate the need for the continued use of respiratory protection.

However, there are some noncontrollable variations among returned railcars (i.e. leaking valves). This should be considered when making a decision on respiratory protection requirements for the task of connecting VCM railcars. Due to the potential of residual vinyl chloride, production supervision and Industrial Hygiene agreed that air supplied respirators must be used for the connection step.

Data confirms that the potential for exposure to vinyl chloride during disconnecting is below the permissible short-term excursion limit. This is because the procedure contains a final step which requires repeated blowdown of the loading line back through the vinyl chloride recovery system. Therefore, we conclude that respiratory protection is no longer required for the task of disconnecting vinyl chloride railcars based on the current operating procedure.

R&S 149330

The job task of sampling VCM railcars needs to be thoroughly evaluated for its contribution to the overall 8-hour TWA concentration. We recommend simultaneous monitoring on one operator for the sampling task and the full shift. This will provide the information needed to determine the effect of its impact on the operator's potential full shift exposure.

The final table (Table 4) included in this communiqué summarizes the data which provides the basis for all our recommendations.

We would also like to lend support to the 1992 sampling program which calls for conducting quarterly monitoring.


Maralee Marchant
Industrial Hygiene Department


Bruce Heinze

attachments

CC: Gary Meier
Geof Kusch

Tabl 1: Results of Employee's 8-Hour TWA Exposure to Vinyl Chloride at the Vinyl 2 Plant during April and May 1992

Job Classification	Date	Sample duration	Conc. (v/v) PPM	Comments
OS	4/23/92	480	<0.20 a	Outside rounds in Vinyl end of plant
OS	4/23/92	447	0.26	Outside rounds in EDC end of plant
OS	4/23/92	480	0.40	Catching samples and analyzing VCM and EDC
Blank	4/23/92		None Detected	
Engineer	4/29/92	474	ND(0.20) b	Made rounds thru Oxy end of plant
Safety Tech	4/29/92	472	1.60	Loading and Sampling VCM
OS	4/29/92	527	0.93	Catching and analyzing VCM&EDC samples (wore Full Face-OVAG to catch samples)
Blank	4/29/92		None Detected	
Laborer	5/5/92	435	<0.14	Routine maintenance duties
SOS	5/5/92	495	0.21	Outside work, repaired leak on F106 (wore SCBA for repair work)
Area Sample	5/5/92	475	0.34	T260 & T261 Area
Instrmt. Tech.	5/5/92	497	<0.12	Instrument Calibration
Area Sample	5/5/92	481	<0.12	D260 & D140 Area
Blank	5/5/92		None Detected	

Industrial Hygiene Exposure Guidelines

OSHA 8 hour PEL	1 ppm
OSHA 15 min. STEL	5 ppm

a) < = Below the limit of quantitation for the given sampling conditions.

b) ND = None detected at the Analytical Detection Limits noted in parenthesis.

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**Table 2: Results of Employee's 8-Hour TWA and Short Term Excursion
Exposure to Vinyl Chloride at the Vinyl 2 Plant during May 1992**

Job Classification	Date	Sample duration	Conc. (v/v) PPM	Comments (a)
Safety Tech	5/29/92	486	00.14	Connecting, loading, disconnecting Tank Cars
Safety Tech	5/29/92	15	00.41	Tank Car Disconnect at #10 & 16
Safety Tech	5/29/92	15	ND(0.17) b	Connecting Tank Cars at #1&3
OS	5/29/92	15	01.10	Connecting at #13-16
OS	5/29/92	15	03.00	Connecting #9 (0.5" Jumper left open for a few sec.s)
OS	5/29/92	15	00.49	TC disconnect #6 & 8
OS	5/29/92	15	04.70	TC disconnect #2 & 4
OS	5/29/92	15	<0.17 c	Connecting at #4, 6 & 8
OS	5/29/92	480	00.07	Catching and Analyzing VCM & EDC Samples
Safety Tech	5/29/92	15	03.10	TC disconnect #12

Industrial Hygiene Exposure Guidelines

OSHA 8 hour PEL	1 ppm
OSHA 15 min. STEL	5 ppm

a) All personnel wore Full Face Air Supplied Respirators.

b) ND = None detected at the Analytical Detection Limits noted in parenthesis.

c) < = Below the limit of quantitation for the given sampling conditions.

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Table 3: Results of Employee's 8-Hour TWA and Short Term Excursion Exposure to Vinyl Chloride at the Vinyl 2 Plant during June 1992

Job Classification	Date	Sample duration	Conc. (v/v) PPM	Comments (a)
Safety Tech	6/3/92	15	00.17	Connecting at #7&8
OS	6/3/92	465	00.18	Connecting, loading, disconnecting Tank Cars
OS	6/3/92	15	ND(0.17) b	Connecting at #3&4
OS	6/3/92	15	01.00	Connecting at #5&6
Safety Tech	6/3/92	15	<0.17 c	TC disconnect #15&16
Safety Tech	6/3/92	15	ND(0.17)	TC disconnect #9&10
OS	6/3/92	15	00.55	TC disconnect #4&5
Safety Tech	6/3/92	15	ND(0.17)	TC disconnect #11
Safety Tech	6/3/92	472	00.32	Connecting, loading, disconnecting Tank Cars
Safety Tech	6/3/92	15	01.60	Connecting at #1&2
OS	6/3/92	15	ND(0.17)	TC disconnect #13&14
Blank	6/3/92		None Detected	

Industrial Hygiene Exposure Guidelines

OSHA 8 hour PEL	1 ppm
OSHA 15 min. STEL	5 ppm

- a) All personnel wore Full Face Air Supplied Respirators.
b) ND = None detected at the Analytical Detection Limits noted in parenthesis.
c) < = Below the limit of quantitation for the given sampling conditions.

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Table 4: Summary of Employee Exposure to Vinyl Chloride at the Vinyl 2 Plant during April, May, and June 1992

Job Classification	Date	Sample duration	Conc. (v/v) PPM	
			Range	Average
OS/ST	4/23/92	480	<0.20 - 0.40	0.29
OS/ST	4/29/92	472	0.93 - 1.6	1.3
SOS	5/5/92	495	0.21	NA
OS/ST	5/29/92	486	0.07 - 0.14	0.11
Connecting	5/29/92	15	0.17 - 3.0	1.4
Disconnect	5/29/92	15	0.41 - 4.7	2.2
OS/ST	6/3/92	465	0.18 - 0.32	0.25
Connecting	6/3/92	15	0.17 - 1.6	0.62
Disconnect	6/3/92	15	<0.17 - 0.55	0.25

Industrial Hygiene Guidelines :

OSHA 8-Hour PEL:

1 ppm

OSHA STEL:

5 ppm

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Table 4A: Results of Employee's Exposure to Vinyl Chloride at the Vinyl 2 Plant Dow Chemical, Plaquemine, LA 1992

sample #	Job Classification	Date	Sample duration	Flow rate (ml/min)	Total volume (L)	Lab result (mg)	Conc. (v/v) PPM	Comments/Task	Respirator
12708	Oper. Specialist	4/23/92	480	49.2	23.62	0.0120	<0.20 A	Outside rounds in Vinyl end of plant	NO
12709	Oper. Specialist	4/23/92	447	48.8	21.81	0.0145	00.26	Outside rounds in EDC end of plant	NO
12732	Oper. Specialist	4/23/92	480	50	24.00	0.0246	00.40	Catching samples and analyzing VCM and EDC	NO
12727	Blank					Non Detected			
MRM/BAH 5/5/92									
14048	Engineer	4/29/92	474	50.7	24.03	0.0120	ND(0.20) B	Made rounds thru Oxy end of plant	NO
14050	Safety Tech	4/29/92	472	50.6	23.88	0.0991	01.62	Loading and Sampling VCM	NO
14051	Oper. Specialist	4/29/92	527	49.4	26.03	0.0618	00.93	Catching and analyzing VCM&EDC samples	FF/OVAG
14047	Blank	4/29/92				Non Detected			
14052	Laborer	5/5/92	435	49.7	21.62	0.0120	<0.14	Routine maintenance duties	NO
14053	SCS	5/5/92	495	49.6	24.55	0.0213	00.21	Outside work, repaired leak on F106	SCBA
14055	Area Sample	5/5/92	475	49.5	23.51	0.0319	00.34	T260 & T261 Area	NA
14058	Instrument Tech.	5/5/92	497	49.9	24.80	0.0120	<0.12	Instrument Calibration	NO
14059	Area Sample	5/5/92	481	49.4	23.76	0.0120	<0.12	D260 & D140 Area	NA
14060	Blank	5/5/92				Non Detected			
MRM 5/25/92									
14061	Safety Tech	5/29/92	486	49.2	23.91	0.0086	00.14	Connecting, loading, disconnecting Tank Cars	FF/AL
14064	Safety Tech	5/29/92	15	197.8	02.97	0.0031	00.41	Tank Car Disconnect at #10 & 16	FF/AL
13956	Safety Tech	5/29/92	15	197.8	02.97	0.0013	ND(0.17) A	Connecting Tank Cars at #1&3	FF/AL
13955	Oper. Specialist	5/29/92	15	200.4	03.01	0.0086	01.12	Connecting at #13-16	FF/AL
13954	Oper. Specialist	5/29/92	15	197.8	02.97	0.0225	02.97	Connecting #9 (0.5" Jumper left open for a few	FF/AL
14063	Oper. Specialist	5/29/92	15	200.4	03.01	0.0038	00.49	TC disconnect #6 & 8	FF/AL
13951	Oper. Specialist	5/29/92	15	200.4	03.01	0.0364	04.74	TC disconnect #2 & 4	FF/AL
13957	Oper. Specialist	5/29/92	15	197.8	02.97	0.0013	<0.17 B	Connecting at #4, 6 & 8	FF/AL
14062	Oper. Specialist	5/29/92	480	50.74	24.36	0.0043	00.07	Catching and Analyzing VCM & EDC Samples	FF/AL
14065	Safety Tech	5/29/92	15	197.8	02.97	0.0233	03.07	TC disconnect #12	FF/AL
MRM 6/1/92									
13960	Safety Tech	6/3/92	15	199.6	02.99	0.0013	00.17	Connecting at #7&8	FF/AL
13962	Oper. Specialist	6/3/92	465	50.5	23.48	0.0109	00.18	Connecting, loading, disconnecting Tank Cars	FF/AL
13963	Oper. Specialist	6/3/92	15	199.2	02.99	0.0013	ND(0.17)	Connecting at #3&4	FF/AL
13965	Oper. Specialist	6/3/92	15	199.2	02.99	0.0077	01.01	Connecting at #5&6	FF/AL
13966	Safety Tech	6/3/92	15	199.6	02.99	0.0013	<0.17	TC disconnect #15&16	FF/AL
13967	Safety Tech	6/3/92	15	199.6	02.99	0.0013	ND(0.17)	TC disconnect #9&10	FF/AL
13969	Oper. Specialist	6/3/92	15	199.2	02.99	0.0042	00.55	TC disconnect #4&5	FF/AL
13970	Safety Tech	6/3/92	15	199.6	02.99	0.0013	ND(0.17)	TC disconnect #11	FF/AL
13971	Safety Tech	6/3/92	472	50.9	24.02	0.0197	00.32	Connecting, loading, disconnecting Tank Cars	FF/AL
13972	Safety Tech	6/3/92	15	199.6	02.99	0.0121	01.58	Connecting at #1&2	FF/AL
13973	Oper. Specialist	6/3/92	15	199.2	02.99	0.0013	ND(0.17)	TC disconnect #13&14	FF/AL
13974	Blank	6/3/92				Non Detected			

MRM 6/24/92

Industrial Hygiene Exposure Guidelines

OSHA 8 hour PEL	1 ppm
OSHA 15 min. STEL	5 ppm

A) ND = None detected at the Analytical Detection Limits noted in parenthesis.

B) < = Below the limit of quantitation for the given sampling conditions.

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R&S149337

92HAZTRN.XLS

EMPLOYEE	TOTAL	HAZ	S&LP	SAFEMTG.	S&LP	S&LP	FIRE	SAFEMTG.	SAFEMTG.	SAF./ REF.
	HOURS	WOPER	SAF.EQUIP	"BLEVE"	SUPERV.	SPILL	TRAIN.	"THE CON-	ENVIROM.	AERIAL
		HOURS	ACET/REG.		INVESTIG	CLEN/UP		VINCER"	AMBASS.	LIFTS
			JAN.-92	FEB.-92	FEB.-92	MAR.-92	MAR.-92	APR.-92	May-92	May-92
	15.23	12.73	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	17.63	15.63	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	16.73	15.98	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	27.74	25.74					1.5	0.25	0.5	0.5
	19.48	16.48	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	16.98	13.98	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	15.38	15.38	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	16.06	13.56	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	14.68	12.93	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	15.41	15.41	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	17.33	15.58	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	16.48	13.48	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	17.83	16.08	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	16.06	13.56	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	14.79	12.79	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	11.73	11.73	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	17.14	17.14	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	12.31	10.81	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	19.33	17.58	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	16.83	15.08	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	15.48	13.73	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	11.81	11.81	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	18.31	15.31	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	13.71	11.71	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	15.31	13.31	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	13.81	11.31	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	18.06	15.56	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	14.14	11.64	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	17.73	15.73	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	28.31	20.31	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5

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R&S149338

92HAZTRN.XLS

EMPLOYEE	SAFEMTG. "STRESS/ ADVANT." Jun-92	SAFEMTG. EDC ISSUES Jul-92	USA STAND. PERMITS Jul-92	ENVIRO. AMBASS. '92	SAFEBTG. "SPEAK EXPER." OCT.-92	REVIEW EMER. PLAN NOV.-92	S&LP RED TAGS NOV.-92	MANGE. OF CHANGE NOV.-92	RESPON. CARE NOV.-92	N/H/TR. S&LP PREVN. Jul-92
	0.5	0.33	2		0.33					
	0.5	0.33			0.33	1	1			
	0.5	0.33		2	0.33	0.25	0.5	1.5	0.5	
	0.5	0.33		2	0.33		1			1
	0.5	0.33		2	0.33	0.5	1			
	0.5	0.33			0.33	0.5	1			
	0.5	0.33		2	0.33	0.25	0.5	1.5	0.5	
	0.5	0.33	2		0.33		1			
	0.5	0.33	2		0.33	1.5				
	0.5	0.33	2		0.33	0.25	0.25	1.5	0.5	
	0.5	0.33		2	0.33	1.5	0.5			
	0.5	0.33			0.33	0.5	1			
	0.5	0.33	2		0.33	1.5	0.5			
	0.5	0.33	2		0.33		1			
	0.5	0.33		2	0.33		1			
	0.5	0.33			0.33		0.75			
	0.5	0.33	2	2	0.33		0.33	1.5	0.5	
	0.5	0.33			0.33		1			
	0.5	0.33	2	2	0.33	1.5	0.5			
	0.5	0.33	2	2	0.33	1.5	0.5			
	0.5	0.33	2		0.33		0.5			
	0.5	0.33			0.33	0.25	0.33	1.5	0.5	
	0.5	0.33			0.33	0.5	2			
	0.5	0.33		2	0.33		0.33			
	0.5	0.33		2	0.33		1			
	0.5	0.33			0.33		1			
	0.5	0.33	2	2	0.33		1			
	0.5	0.33			0.33		1			
	0.5	0.33	2	2	0.33		1			
	0.5	0.33	2	2	0.33	1.5	0.5			
	0.5	0.33	2	2	0.33	2.5	1.5	1.5	0.5	

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R&S149339

92HAZTRN.XLS

EMPLOYEE	N/H/TRAIN RESPON. CARE JULY.-92	N/H/TRAIN SAFETY JULY.-92	N/H/TRAIN RESPIR. IND/HYG. Jul-92	ENVIRO. GUIDEL. NOV.-92	SPC/SPCC VCM STAND HAZC/TAPE DEC.-92	SAFEMTG. PER/PROT. EQUIP. DEC.-92	EXPOSURE DATA/1992 HEAR.C/P DEC.-92	PACKING WASTE DISPOS* DEC.-92	RECRA TRAIN. * THROX/TOX DEC.-92
					1.75	0.5	1.25	0.5	0.5
					4.5	0.25	1.5	0.5	0.5
				0.75	1.75	0.25	1.5	0.5	0.5
	1.33	8	4		1.5	0.25	1.5	0.25	0.5
					1.75	0.5	2	1	1
					1.75	0.5	2	1	1
				0.75	1.5	0.25	1.5	0.5	0.5
					1.75	0.5	1.25	0.33	0.5
					2.6		1.5	0.6	0.5
				0.75	1.35	0.25	1.5	0.33	0.5
					2.5	0.25	1.5	0.6	0.5
					1.75	0.5	1.5	1	1
					2.5	0.25	1.5	0.6	1
					1.75	0.5	1.25	0.33	0.5
					1.23	0.25	1.5	0.33	0.5
					1.5	0.25	1.5	0.5	0.5
				0.75	1.75	0.25	1.25	0.33	0.5
					1.83	0.25	1.5	0.5	0.5
					2.5	0.25	1.5	0.6	0.5
						0.25	1.5	0.6	0.5
					2.5	0.25	1.5	0.25	0.5
				0.75	0.5	0.25	1.5	0.25	0.5
					1.83	0.5	2	1	1
					0.5	0.25	1.5	0.4	0.5
					1.83	0.25	1.5	0.5	0.5
					1.83	0.25	1.5	0.5	0.5
					1.75	0.5	1.25	0.33	0.5
					2	0.25	1.5	0.5	0.5
					2.75			0.5	0.5
					1.75	0.25	1.5	0.33	0.5

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EMPLOYEE	REACT. CHEM. REV.	JLG TRAIN.	FORKLIFT TRAIN.
		1992	DEC.-92
	1	1.25	1.25
	1.15	1	1
	0.75	0.75	
	0.5	1	1
	1.5	1.5	1.5
	1	1.5	1.5
	0.4		
	1	1.25	1.25
	1	1	0.75
	1		
	1	1	0.75
	1	1.5	1.5
	1	1	0.75
	1	1.25	1.25
	0.75	1	1
	1.5		
	0.75		
		1.5	
	1	1	0.75
	1	1	0.75
	1	1	0.75
	0.25		
	1.25	1.5	1.5
	1	1	1
	0.5	1	1
	0.5	1.5	1
	1	1.25	1.25
	0.66	1.5	1
	0.75	1	1
	0.75	4	4

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R&S149341

92HAZTRN.XLS

EMPLOYEE	TOTAL	HAZ	S&LP	SAFEMTG.	S&LP	S&LP	FIRE	SAFEMTG.	SAFEMTG.	SAF./ REF.
	HOURS	WOPER	SAF.EQUIP	"BLEVE"	SUPERV.	SPILL	TRAIN.	"THE CON-	ENVIROM.	AERIAL
		HOURS	ACET/REG.		INVESTIG	CLEN/UP		VINCER"	AMBASS.	LIFTS
			JAN.-92	FEB.-92	FEB.-92	MAR.-92	MAR.-92	APR.-92	May-92	May-92
	14.98	12.98	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	13.27	12.87	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	12.58	12.18	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	14.48	11.48	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	14.48	11.48	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	19.98	17.98	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	16.43	16.43	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	12.3	12.3	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	15.56	13.06	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	9.97	9.97	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	15.1	15.1	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	14.31	11.81	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	15.89	15.89	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	18.06	15.56	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	14.23	14.23	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	9.81	9.81	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	18.88	16.88	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	15.39	15.39	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	16.06	13.56	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5
	11.73	9.73	0.33	0.33	0.33	0.33	1.5	0.25	0.5	0.5



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